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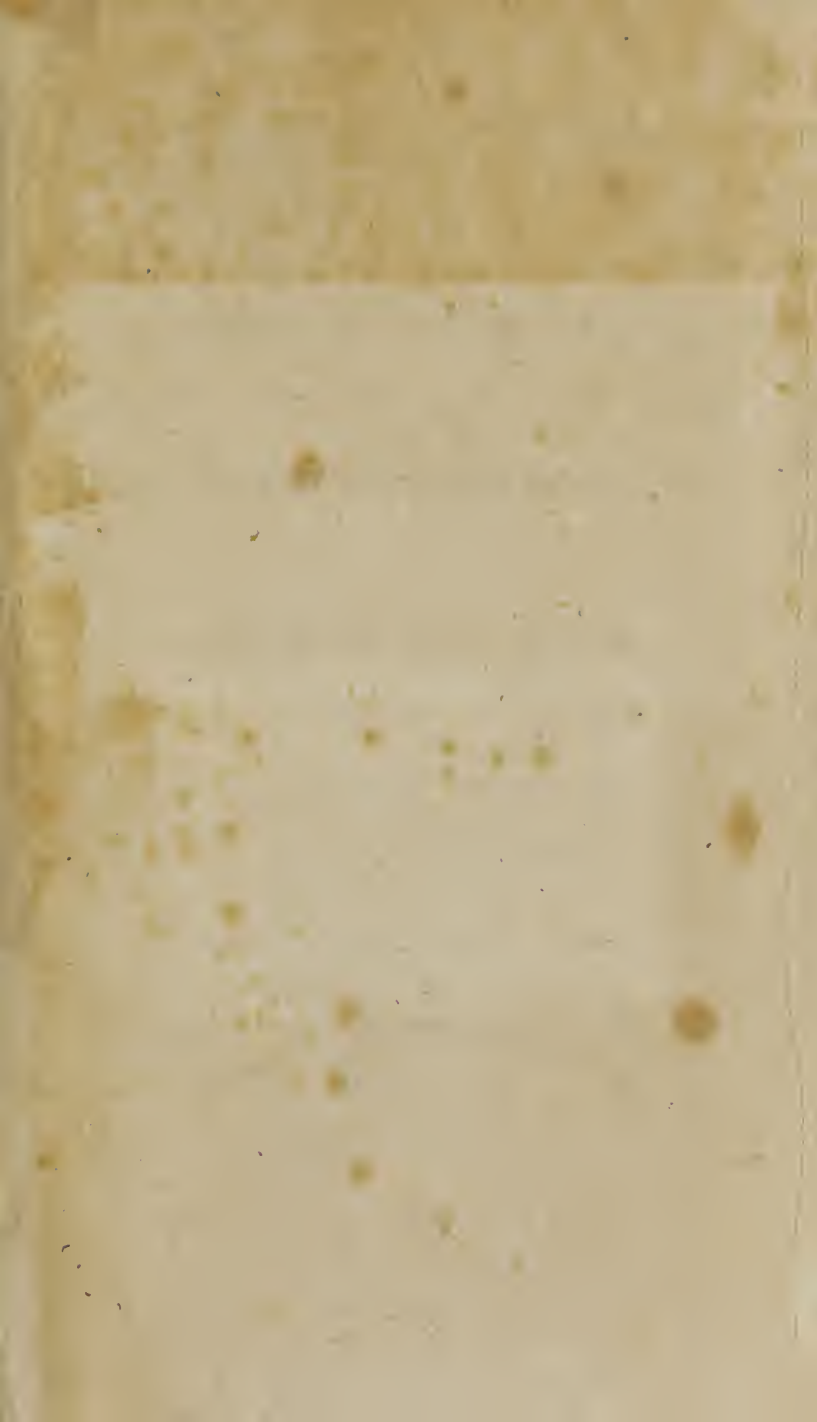
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DISSERTATION

ON THE

PROPERTIES AND EFFECTS

OF THE

DATURA STRAMONIUM,

OR

COMMON THORN-APPLE;

AND

ON ITS USE

IN MEDICINE.

By SAMUEL COOPER,

Member of the Chemical and Medical Societies of Philadelphia.

PHILADELPHIA:

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M, DCC, XCVII.



AN
I N A U G U R A L
DISSERTATION ON STRAMONIUM

SUBMITTED TO THE EXAMINATION OF

THE REV. JOHN EWING, S. S. T. P. Provost,

THE

TRUSTEES AND MEDICAL FACULTY

OF THE

UNIVERSITY OF PENNSYLVANIA,

On the 12th of May, 1797,

For the Degree of Doctor of Medicine.

TO THE
MANAGERS AND PHYSICIANS
OF THE
PENNSYLVANIA HOSPITAL,

WHOSE BENEVOLENT LABORS GREATLY CONTRIBUTE TO THE

BENEFIT OF MANKIND,

AND TO THE PROMOTION OF

MEDICAL SCIENCE;

THIS

DISSERTATION IS INSCRIBED,

AS A MARK,

OF GRATITUDE, AND RESPECT,

BY THEIR OBLIGED FRIEND,

AND PUPIL,

THE AUTHOR.

P R E F A C E.

IN the following pages we have ventured to bring into view some experiments and observations, relative to the properties and effects of the *Datura Stramonium*, or common Thorn-apple. It was thought that, as this active plant has not received much attention from the medical experimenter, it was worthy of further investigation. It furnishes a subject extensive, and important. He, who would do justice to such a subject, should possess talents, leisure, and industry. To a deficiency in the two *former* points many of the imperfections of the present work may be justly

ascribed. Instead of some months, or rather weeks, could a few years have been devoted to its execution, it might have been less imperfect, and consequently less unworthy of the acceptance of the reader. With great diffidence it is submitted to his inspection.

A

DISSERTATION, &c.

THE vegetable world is highly tributary to the existence and happiness of man. From hence he derives many articles of food, and many remedies for disease; and it is probable that his happiness will increase in proportion, as ingenuity or accident shall give rise to useful discoveries in this department of nature. Many unknown plants doubtless inhabit our globe; some of which may possess valuable alimentary properties; and others again may be imbued with energies capable of obviating some of the *present* incurable diseases, which invade the animal system. These plants and their uses, will, sooner or later, be discovered. In the mean while, any effort to extend our knowledge of such, as are imperfectly known, may be attended with advantage. Influenced by this belief, we have been led to devote some time to the consideration of the *Datura Stramonium*. We shall premise some

remarks on its natural history, and afterwards attempt an experimental investigation of its component parts, of its effects on the animal body, and of its use in medicine. The Genus *Datura* is arranged by the celebrated Linnæus, in the class Pentandria, and order Monogynia; and is thus described, "*Datura*. Cor. funnel-form. Cal. tubular; angled, deciduous. Caps. 4—valved."* This genus includes seven species; that of which we are about to treat, is the second, with "Pericarps thorny erect egged, leaves egged smooth.*" In respect to the leaves, this description is erroneous, if we may be guided by observation, and by the authority of Dr. Haller and Dr. Woodville. The leaves are not egged; but the plant when it is very young, has for the most part egged, or ovate leaves; and Linnæus might have drawn its specific character from an imperfect specimen. According to Dr. Haller they are angled; and according to Dr. Woodville, they are pointed at the extremity, indented, and formed into several obtuse angles.

This species of thorn-apple very generally grows throughout the United States. Whether it be a native of these states, or an exotic, is a question, which has not been yet determined by botanists. It is an annual plant. It grows upon the borders of roads, around houses, in gardens, and upon vacant lots. It delights in a nitrous soil, and seems to love the abodes of man. It not only flourishes in the neighbourhood of Philadelphia, but by the sides of some of the streets, in some yards, and in great abundance, particularly in the vacant Northern grounds of the city. Its general

* System of Vegetables of Linnaeus translated by a Botanical Society at Lichfield. London, 1783.

height is from two to four, but it sometimes reaches to the height of ten feet. It springs from the earth about the latter end of May, from which time it continues to spring, till vegetation be checked by the cold of autumn. Its flowers are produced in the two last summer and the first autumnal months. They appear in succession, and may be seen on the extreme branches when the lower ones possess thorny seed-vessels. These observations, relative to the first appearance, duration, and flowering of the plant, will chiefly apply to the neighborhood of Philadelphia.

In its progress to maturity the face of the *Stramonium* considerably alters. The stalk at first acquires two opposite lanced, and afterwards several ovate leaves, arranged in an alternate order. After some time these opposite and alternate leaves decay; the stalk divides into branches; these branches divide into others, and leaves of a different form are produced. The leaves are now irregularly set, and are angled and indented.* The flowers are most frequently white: they are placed on short peduncles at the junction of the branches and leaves. Some plants possess purple flowers, and purple stalks, while others again have these parts tinged of a blue color. Hence it appears, that three varieties belong to the *Datura Stramonium*. The stamina are generally five, at times six, and at other times, one of them is cleft supporting two anthers. The thorny capsules are replete with kidney-form seeds, of a dark brown color. A capsule of the common size contain-

* Dr. Woodville, in his elegant work entitled *Medical Botany*, makes the leaves of this plant alternate. This I think, is an inaccuracy.

ed seven hundred and fifty seeds. The root is white and fibrous.

Many caterpillars feed upon the leaves, and especially one, which is a species of sphinx, and is that which feeds upon the tobacco. A small beetle eats the leaves into numerous perforations. The leaves are sometimes infested by the puceron or louse of plants. Professor Barton has been well informed, that the goat eats both the leaf, and the seed vessel. A similar occurrence fell beneath my own observation about the commencement of last fall. A female goat daily devoured large quantities of the leaves, and at the same time gave milk, which was used by a man, and his wife, and their two children. At this time three of the family were diseased; the man and his wife labored under intermittents, and one of the children under an affection of the bowels. This milk was probably imbued with noxious properties; and if it did not cause, might have increased, or disposed to, their complaints.

The odor of the leaves does not appear to be offensive to the bat, or the mouse, as I found by exposing them to it in vessels which had proper air-holes. Upon bringing a large quantity of the boughs of the plant into a room, a dog seemingly in health, ran to them, laid down among them, and slept without appearing to experience any inconvenience from their exhalation. Notwithstanding what has been said, the exhalation of this plant may be offensive to some insects, and to some animals. It is frequently offensive to man, as will appear in the subsequent pages.

EXPERIMENTS ON STRAMONIUM.

EXPERIMENT I.

A POUND and an half of the pounded leaves of stramonium, and a gallon of water were put into an alembic, to which a constant fire was applied. After some time a colorless fluid collected in the receiver; this was tasted and seemed slightly to possess the properties of the plant. Nothing resembling essential oil appeared on the surface of the distilled fluid. Upon continuing the distillation an empyreumatic liquid was obtained.

EXPERIMENT II.

AN ounce of the colorless fluid just mentioned was taken by a healthy person; and its effects were very inconsiderable; it seemed only to induce a slight nausea. This experiment was repeated with a similar result.

EXPERIMENT III.

By subjecting the dried leaves in a stone retort to a violent heat, a dark oil of a disagreeable odor was obtained. This oil possibly arose from a decomposition of the resin of the leaves; the resin losing its oxygen; and hence becoming an oil.

EXPERIMENT IV.

A QUART of the expressed juice of the leaves was suffered to stand many days in an atmosphere moderately warm. A degree of fermentation seemed to take place in the liquid, and a white oleaginous matter gradually arose to its surface. My ingenious friend Dr. Woodhouse informed me, that, he once procured a considerable quantity of a substance which resembled oil, by infusing this vegetable in water for some weeks.

EXPERIMENT V.

A LARGE handful of the leaves were burnt to ashes, upon which water was poured, and suffered to stand a considerable time. The water was then filtered and evaporated. By this process a small quantity of potash was procured.

EXPERIMENT VI.

SOME spirit of wine, and half an ounce of the powdered leaves of Stramonium, were rubbed together in a marble mortar. The spirit assumed a deep green color. After decanting this portion of spirit, other portions were added, as long as they appeared by their color

to extract any thing from the powder. The clear decanted liquid was evaporated, and afforded twelve grains of resin. I am induced to believe that four drachms of the above substance contain a larger portion than twelve grains. Does not a portion of the resin rise into the air with the alcohol? This I think was the case in one of my experiments. Highly rectified spirit of wine was poured, quantity after quantity, on an ounce of the powdered leaves; was frequently shaken with the material, and afterwards decanted. The spirit used in this way amounted to eight pounds. The whole of the decanted liquid, upon evaporation, only yielded eight grains of resin.

EXPERIMENT VII.

THE four drachms, which had been subjected to the action of alcohol, were triturated with repeated quantities of rain water, till the water ceased to be colored. Upon filtering and evaporating these quantities of colored water, one scruple of gummy matter was obtained, among which many very minute saline crystals were visible. The matter which the spirit and water did not dissolve was insipid, grey, and earthy. Being dried, it was found to weigh two drachms, eighteen grains.

EXPERIMENT VIII.

A CONSIDERABLE quantity of the dried leaves were infused in snow water for two or three days. The infusion was exposed to an intense cold; the whole of it became a congealed mass, except a small quantity, which was dark, and which remained beneath the ice. This dark fluid crystalized upon removing it into another vessel. The crystals resembled nitre, in their form, and in their taste. The powdered leaves thrown upon live coals sparkle like small particles of nitre.

EXPERIMENT IX.

THE watery infusion of the leaves is yellow, bitter, and somewhat nauseous. The spirituous tincture of them is green, and astringent; and upon adding some of it to a solution of sulphate of iron, a brown thick fluid was formed.

EXPERIMENT X.

I PUT a quantity of the pounded seed with some water into a vessel, which was exposed to a boiling heat. Globules of oil rose to the surface of the fluid, which resembled sweet-oil in color, and in taste. When

the pounded seeds are wrapped in paper they stain it like oil; when they are thrown into the fire they flame; and when they are set in a dish, and exposed to heat, an exhalation arises similar to that, which emanates from roasting coffee.

EXPERIMENT XI.

HALF an ounce of the sliced root was infused in a pint of water for three days. About four ounces of the strained infusion were swallowed. They produced some fever, which was accompanied by a slight intoxication, and head-ache. This infusion is not disagreeable to the taste.

EXPERIMENT XII.

I PLACED a grain of the powdered leaves upon my tongue, and suffered it gradually to mix with the saliva of my mouth. A highly bitter and nauseous taste and an increased flow of saliva ensued. The disagreeable taste remained many minutes after ejecting the material from my mouth.

EXPERIMENT XIII.

ABOUT two grains of the powder was snuffed up the nose; some irritation was immediately felt in the membrane; sneezing occurred, and the mucus of the part was increased in quantity.

EXPERIMENT XIV.

Two scruples of the powder were put into a phial, and an ounce and an half of warm water were poured upon them. The phial was frequently shaken; and the contents of it in about half an hour were filtered. The filtrated liquor possessed a yellowish color, and a taste more bitter than nauseous. Of this an ounce was injected into the urethra. A slight heat and pain were the consequence.

EXPERIMENT XV.

A DROP of the above filtrated liquor was let fall into the left eye. An uneasy sensation of the part was immediately experienced. In five minutes the uneasiness seemed to be somewhat increased; in ten it was less; in fifteen a slight pain occurred in the other eye. In half an hour the pupil of the eye on which the fluid was suffered to fall began to enlarge. The pupil previously to its dilation appeared to be more contracted than that of the right eye. It was largest about twelve hours after the experiment; at which time it was viewed in a considerable light, and seemed thrice as large as the other. It continued dilated during two days. In a strong light, objects were seen more distinctly with the right eye, but in a weak light, or in the dark, with the dilated one. This experiment was made upon myself. It was repeated on a boy

about fourteen years old; in this case the liquid used, was the expressed juice of the leaves diluted with water. He sat in a pretty strong light, and in about ten minutes after the application, he was of opinion that the vision of the affected eye was increased in energy. The other phenomena were similar to those related in the former experiment. In this instance the dilatation of the pupil continued three days. But my friends Dr. Bache and Thomas Horsfield to whose eyes the infusion was applied, experienced afterwards no increase of sight in the dark. To experience this effect their pupils perhaps were not sufficiently dilated.

DR. RUSH, when treating of vision, informs his class, that a certain philosopher, who lectured in Philadelphia, was accustomed to give the following advice to his pupils. For some time previously to appearing in the company of ladies you should view a piece of black cloath, which will render your eyes soft and languishing. If any of his audience had been disposed to follow this advice, they might have accomplished the desired end, with greater ease, and effect, by letting fall into the eye a drop of the infusion of stramonium.

EXPERIMENT XVI.

A DROP of the expressed juice was let fall into the eye of a cat. An itching or pain of the part appeared to be induced; the animal making great exertions with her feet as if she wished to rub off the material. The

whole of the colored part of the eye seemed in a short time to be converted into pupil. Inflammation and a puriform discharge, of many days continuance, succeeded.

EXPERIMENT XVII.

I SCRAPED away a portion of the cuticle from my wrist. Upon applying the fresh leaves pounded into a soft poultice to the part; it swelled, and became so painful, that after some time, I was induced to change the application for that of a mild cerate.

EXPERIMENT XVIII.

A QUANTITY of the pounded leaves was bound on the inner surface, and about midway of the thigh, and suffered to remain unremoved during twelve hours. No other effect than a moisture on the skin was apparently produced by the application.

EXPERIMENT XIX.

ABOUT four o'clock in the afternoon six ounces of a warm decoction of the leaves were rubbed on each arm of a boy till the whole disappeared. In a very short time he was affected with febrile symptoms, his head

becoming light, his skin warm and sweaty, and his mouth dry. He was troubled with a slight head-ache during the whole of the next day.

EXPERIMENT XX.

A RAT, so young that it was nearly devoid of hair, was treated in the following manner. A decoction of the leaves, the same in strength as in the former experiment, was liberally applied to the surface of its body. It was quickly roused out of its quiet state, and made violent, but irregular, exertions to move away. These exertions seemed to be of the convulsive kind. They would suddenly cease, and the animal would fall on its side, and lie as if asleep; and their return would be equally sudden. This alternate activity and torpor of the animal frequently occurred, but gradually diminished, and entirely disappeared in a few hours. To another equally young, water similar in quantity and temperature to the decoction, was in like manner applied. The water excited it into considerable exertion, but its motions were more natural than those of the former.

EXPERIMENT XXI.

At night I strewed fresh branches of the plant on my bed, on each side of the pillow, and about the room. I afterwards went to bed, slept, and awoke in the morning with a slight fever and head-ache.

EXPERIMENT XXII.

To I. L. twenty-six years old, healthy, his pulse beating seventy two strokes in a minute, I gave one grain of the powdered leaves of stramonium diffused in about an ounce of temperate water.

In	2	5	10	15	20	25	30	35	40	45	55	65	Minutes.
The pulse beat	72	73	72	74	73	73	73	71	71	70	60	80	Strokes.

In about ten minutes his pulse seemed to be somewhat increased in force. In twenty minutes he became dull; and in thirty began to doze. In thirty-four minutes the pulse was full and unequal, and in forty-seven somewhat tense, and less unequal. He continued to doze till about the fifty-fifth minute; at this time some tea was handed him, which he drank, and which raised his pulse to eighty-nine quick strokes. This experiment was made in the evening; and next day he informed me, that he had experienced during the night much heat in his hands and feet.

EXPERIMENT XXIII.

To P. M. healthy, thirty-two years old, his pulse soft and full, and beating seventy-four strokes in a minute, I gave two grains of the leaves diffused in water.

In	5	10	15	20	25	30	35	40	45	50	55	60	65	Minutes.
Pulse beat	80	76	76	78	79	82	83	82	84	79	80	84	71	Strokes.

When ten minutes had elapsed he found his head somewhat giddy: in twenty he was drowsy, and his pulse was quick. In thirty minutes his hands sweated: in forty his tongue acquired some whiteness, and the eye a pupil somewhat more dilated. In forty-five minutes his pulse beat fuller and quicker strokes; his hands were warm, and covered with sweat; his cheeks redder, and his drowsiness had increased. In fifty minutes he complained of pain in his head; and his whole body was unusually warm:—in sixty his eyes became misty; his stomach sick. Desirous of sleeping he laid his body in a horizontal position. In sixty-five minutes his pulse evidenced great tension and was still fuller. I was now obliged to leave him, but returned to him, about the eightieth minute, and found him asleep; his eye-lids were not completely closed; his face was red, and moist; he resembled a person laboring under the effects of too much spirituous potation.

EXPERIMENT XXIV.

M. F. aged forty, healthy, but having an ulcer on the leg, and his pulse beating seventy-eight strokes in a minute, took in the evening two grains of the powdered leaves suspended in about an ounce of temperate water.

In	5	10	15	20	25	30	40	45	50	55	60	65	70	80	Minutes.
Pulse beat	81	83	83	81	79	78	78	76	74	73	72	70	72	68	Strokes.

In five minutes his pulse was quicker, and between the tenth and fifteenth minute, he was affected with a slight pain of the head. In sixteen minutes he experienced a heaviness in his eyes; in twenty his hands and feet were warm and sweaty; and his pulse was full and tense. In seventy, his face was flushed; and in eighty, nausea supervened. He now drank some cold water, which relieved the nausea, and the other symptoms. On the succeeding morning he informed me, that he felt unusually cheerful, and that his appetite was increased.

EXPERIMENT XXV.

P. M. on whom experiment 23d. was instituted, his pulse beating eighty times in a minute, took four grains of the powdered leaves.

In	2	5	10	15	20	25	35	45	50	60	75	Minutes.
Pulse beat	81	76	80	78	76	74	74	68	66	66	66	Strokes.

In twelve minutes the pulse was more full and tense, and the heat of his face and hands was increased. In twenty-eight minutes his head became giddy, and his stomach sick. This sickness at stomach was of short duration. In about forty-eight minutes the fullness and tension of his pulse had rather increased. In about seventy minutes evident intoxication was induced, resembling that which arises from drinking alcohol. His cheeks and his eyes were reddened; his pupils were dilated; his voice faltered; and he was

hardly capable of sitting erect. About the eightieth minute he took some tea, which obviated in some measure the preceding symptoms. In a short time his pulse was felt, and it beat eighty-four strokes in a minute. This experiment was made in the evening. During the night he experienced much head-ache and thirst. On the succeeding morning his tongue was covered with a white pellicle. He was troubled with head-ache and with pain in his limbs for many subsequent days. These latter symptoms regularly supervened upon the approach of evening, and continued till morning.

EXPERIMENT XXVI.

I GAVE to I. C. about fifty years old, and laboring under mania of diminished violence, five grains of the powdered leaves. Previously to exhibiting the medicine, his pulse beat eighty-three times in a minute.

In	5	10	15	20	26	30	40	45	50	55	70	80	Minutes.
Pulse beat	75	73	74	63	61	60	64	66	70	77	75	80	Strokes.

In about eight minutes some nausea occurred: his pulse was more tense. In twenty minutes he had an urinary discharge; in thirty his pulse had become full. The Peruvian bark, he said, that he had taken, had made him thirsty. He drank some water. In forty-two minutes the heat of his body was manifestly increased; and in fifty his cheeks were reddened. About the fifty-eighth minute he had an alvine, and urinary

discharge. In seventy minutes he was thirsty again, and drank; in ninety he had another evacuation of urine.

EXPERIMENT XXVII.

I GAVE to M. F. on whom experiment 24 was made, six grains of the powdered leaves diffused in water. Previously to taking the medicine, his pulse was somewhat full and tense, and beat eighty strokes in a minute.

1 st	3	6	10	15	20	25	30	35	40	45	50	60	65	70	75	80	88	90	95	100	M
P. b	80	84	78	77	75	74	74	74	77	79	80	80	86	87	87	87	100	90	102	105	S.

In five minutes his pulse had undergone some increase in tension, and he thought that his eyes had become slightly dim. Before ten minutes had elapsed his hands were warmer, and he had experienced a slight pain in the back part of his head, which was succeeded by dullness of mind. In thirty minutes this dullness was diminished. About the thirty sixth minute he took four grains more of the powder. On the forty-second minute his pulse had increased in tension, and in sixty in quickness. In seventy minutes he was thirsty, dull, and sleepy; in seventy-five he experienced some head ache. About the eightieth minute he was bled to ten ounces. His pulse immediately afterwards was less tense, and quick, and his head-ache, and disposition to sleepiness, though not his thirst, were removed. In ninety-five minutes his

body was warmer, and his thirst greater. I was now obliged to leave him. In three hours I saw him again. During my absence he had taken some drink, slept, and discharged a considerable quantity of urine. He had continued free from any pain in his head; the heat of his body had greatly diminished, and his pulse was full and soft, and only beat seventy-two strokes in a minute. It may be proper to observe that in the beginning of this experiment my patient was sitting, and that when his pulse was last felt he was in a recumbent posture. The blood which was drawn evidenced a degree of sickness.

EXPERIMENT XXVIII.

AFTER bringing the heart of a frog into view, a few drops of the expressed juice of the leaves were applied to it. It ceased to move in a few minutes; and it could not be roused into fresh motion by pricking it with the point of a scalpel. The scalpel was applied afterwards to some of its muscles, and they contracted.

EXPERIMENT XXIX.

UPON bringing into view the heart of a young dog, and the ventricles ceasing to beat, I injected into the vena cava some of the expressed juice. The motion of the heart was renewed; and the heart pulsed many times.

EXPERIMENT XXX.

UPON bringing into view the heart of a frog, about three drachms of the expressed juice was injected into the intestines. Previously to the injection, the heart beat nineteen strong strokes in a minute. In five minutes it beat nineteen quick and stronger strokes. In ten minutes it beat eighteen strokes; in fifteen, seventeen; in twenty, sixteen; in twenty-five, twelve; and in thirty, eight. After the twentieth minute its motions gradually lessened in strength till they entirely ceased. This frog lived about an hour and an half. Another one treated in the same manner, but without the injection, lived for several hours.

EXPERIMENT XXXI.

AFTER removing a portion of the cranium in such a manner as to bring the brain into view, some of the expressed juice was applied to the part. Convulsions were the immediate consequence, the frog dying in three minutes.

EXPERIMENT XXXII.

ABOUT two drachms of the juice were injected into the cavity of the abdomen of a dog. Upon killing the ani-

mal about two hours afterwards and inspecting the abdomen, a portion of the surface of the intestines, and a part of the omentum and peritonæum were preternaturally reddened.

EXPERIMENT XXXIII.

ABOUT half an ounce of the expressed juice of the leaves, was injected into the jugular vein of a bitch. She made one violent struggle and died. She lived about half a minute after injecting the juice: Upon dissection, her blood was found fluid; and a white coagulum had extensively formed in the right auricle and ventricle of the heart. The brain was more watery than natural.

EXPERIMENT XXXIV.

MORE than an ounce of the expressed juice was injected into the rectum of a small dog. In a few minutes the pulse became more frequent and quick. In about ten minutes he endeavoured to vomit, but his endeavours were ineffectual. His stomach was oppressed, and something regurgitated into his mouth which was swallowed as often as it regurgitated. In fifteen minutes he had several stools, which consisted of fæces and of the expressed juice. After these discharges, fresh efforts to vomit ensued, but they were as vain as the former. He tottered as he walked. In half an

hour he became dull and slept. During his sleep his whole frame was affected with frequent tremulous motions or startings. He did not sleep long, made again efforts to vomit; attempted to walk, but was unable; laid down. He now fell into a sleep, of greater composure, and of longer continuance. On the ensuing day he was languid, but able to walk, and took some nourishment, and gradually recovered.

EXPERIMENT XXXV.

To another dog whose pulse was at one hundred and eleven in a minute, I gave about an ounce and an half of a spirituous tincture of the leaves. The pulse gradually increased in quickness, and in frequency; and in thirty minutes it beat one hundred and forty strokes. In twenty-three minutes derangement of mind came on; the animal running in circles, into the fire, against the furniture of the room, tumbling on her side, rolling on her back, and agitating her feet in the air. She was now bled from one of the jugular veins. Her blood, as it flowed, was florid; upon standing some time the crassamentum floated in the serum, was somewhat loose in its texture, and numerous red particles were deposited at the bottom of the bowl. Upon killing and dissecting the animal, neither her flesh, nor her secretions appeared to be imbued with the odor of the tincture of the leaves. In this experiment I was induced to pay attention to the odor of the flesh and secretions, as I had once made a similar experiment with the tincture of opium, and

found that the whole animal upon dissection seemed to be impregnated with its smell. The portion of the tincture of opium used, was about three ounces.

EXPERIMENT XXXVI.

I POURED an ounce and an half of the expressed juice down the throat of a dog used in the last experiment except one. His heart afterwards beat slow and strong strokes. His respiration became more and more laborious, and at length the thorax moved with such force, and irregularity, that the pulsations of the heart could not be felt. His sleep, when he slept, was restless and imperfect. During the two following days he drank, but eat little, slept much, and was found dead on the morning of the fourth day. Upon removing a portion of the cranium the brain was found to be watery. About two drachms of limpid fluid were found in the ventricles of the brain. The lungs appeared to be surcharged with blood. The valve of the pylorus was greatly contracted. The contents of the stomach were yellowish, and consisted partly of the medicine which had been taken. The gall-bladder was highly distended with a dark colored bile; and much bile of the same color was found in the intestines.

EXPERIMENT XXXVII.

I OBTAINED a dog that labored under periodical twitchings or convulsions, which occurred every three or four minutes. He appeared to be old, his frame was emaciated, his countenance dull, and when he walked, his steps were slow and irregular. To this dog I gave a scruple of the extract of the leaves, which was repeated several times. The effects of the medicine were frequent black stools, a frequent flow of darkish urine, thirst, languor, and emaciation of the body. But this treatment did not diminish his convulsions. I now remitted the medicine for several weeks. During this period he became fatter, and more lively than I had hitherto seen him. Upon repeating the medicine in larger doses, similar effects as before, but of a more violent nature, were produced. His respiration became laborious and slow; and his death soon occurred. Upon opening his abdomen a large worm lay naked to the view, except its extreme parts, which were concealed by the intestines. I was much astonished, and much delighted, at a discovery so unexpected; and at once concluded, that the worm had been the cause of convulsion in the dog. It was of a vermilion color, above a yard in length, and nearly an inch in circumference. Professor Barton, so justly celebrated for his profound knowledge of the objects of nature, is of opinion, that this worm is a new species of *Ascaris*. He probably will be induced to describe and arrange it among the vermes.

No perforation through the intestines was obvious; they were full of a yellowish fluid; but not any fluid was found in the cavity of the abdomen. May we not conjecture, that the worm perforated the intestines upon the first exhibition of the stramonium, which according to Dr. Rush and Dr. Fowler is offensive to worms. The external surface of the intestines and stomach were redder than natural. Some parts of the intestines, and much of the mesentery appeared to be in a gangrenous state. A small quantity of water was found in the ventricles of the brain. These last effects, I think, may in great measure be attributed to the violent operation of the medicine.

Observations on the preceding Experiments.

It appears, that the leaves of stramonium possess no essential oil, as they afford none when distilled with water. The distilled water, taken into the stomach, produces little or no effect. Experiments 1, 2.

The oily matter, which rises to the surface of the expressed juice, cannot with strict propriety be called an essential oil, as it does not rise till a degree of fermentation occurs in the juice. This oily matter probably originates from a decomposition of the resin of the fluid.

The dry leaves, when exposed in a retort to a violent heat, yield empyreumatic oil, and when burnt yield potash; products which are afforded by numerous vegetable substances. Exper. 3. 5.

From four drachms of the powdered leaves, which had been exposed to repeated quantities of alcohol, twelve grains of resin were obtained. The same leaves subjected to a pure water yielded one scruple of gummy matter, among which many very minute crystals existed. Had these crystals been separated from the gum, they would perhaps have amounted to three or four grains. Exper. 6. 7. Three grains of the resin, given to a healthy person, produced much exhilaration of mind, fever, and head-ache, and several alvine discharges. Three grains of the gummy matter given to a healthy person, produced a slight exhilara-

tion of mind, fever and head-ache, and a copious flow of urine. Might not this gummy matter be exhibited with effect in some dropsies? The grey, earthy, insipid substance, which, neither the alcohol, nor the water dissolved, weighed two drachms and eighteen grains.

Hence it seems that the constituent parts of the powdered leaves of stramonium are a resin, a gum, an essential salt, and an earthy matter. The resin appears to be the most active part. The gum possesses a bitter, the resin, an astringent principle. Exper. 9.

With regard to the other parts of the plant; the honey of the flowers, the seed and the root; my experiments are extremely deficient. However I may observe that the honey is bitter, the seed and the root sweet, and that they all in a greater or less degree possess the properties of the leaves. An ingenious botanist, William Bartram informs me, that he eats this honey with pleasure, and avidity, and without experiencing any thing morbid from its use. But my fellow student Joseph Johnson assures me, that he once was attacked with head-ache, and with sickness at stomach, after sucking many of the flowers: and professor Barton supposes that this is one of the plants from which the bee, in this country, sometimes extract a pernicious honey. The sweet taste of the seed has betrayed many a child into great danger. The seed and the root are pulverized with much difficulty. When it is necessary to resort to them, it will perhaps be best to roast, grind, and make the former into coffee; and best to slice, and boil the latter for a decoction. In the following experiments, and cases, I have used the leaves in preference to the other parts

of the plant. They may be gathered, dried, and powdered with ease. They may be plucked during the flowering state of the branches, put in an airy and shaded apartment, and pulverized as soon as they become dry. The use of a fine sieve will be proper to obtain the powder free from the fibres of the leaves. It may now be kept in close vessels; and if good, it will possess a beautiful green color.

When this powder is applied to the tender membrane of the nose it produces sneezing, and an increased flow of mucus. When taken into the mouth, it stimulates the salivary glands into great action. Exper. 12, 13. It disagreeably affects the senses of taste and smelling; and if the leaves be chewed for some time they induce a degree of intoxication. In these circumstances stramonium resembles nicotiana, or tobacco. And they are similar in other respects; for the same insect, in the caterpillar, and in the fly state, and the same animal feed alike on both plants. Should man not alter the current of his present propensities, should he continue to indulge a relish for unnatural luxuries, and delight in being the ingenious tormentor of himself; it may be predicted that stramonium, like tobacco and alcohol, will become the bane of society. But a hope is entertained that future generations, taught by the experience and misfortunes of their ancestors, will relinquish the general use, and prevent the introduction, of such injurious articles.

A drop of an infusion of the powder applied to the eye, dilates the pupil. Exper. 15, 16. It is difficult to account for this curious effect produced on the eye. Upon the application of the infusion does an unusual action occur in the external coat of that organ,

which is communicated by sympathy to the retina; an action or affection, which to a certain degree deprives the retina of the power of receiving the impressions of objects? Or does the diffusive vapor of stramonium, like heat or electricity, penetrate to the retina, and excite in it a peculiar disease? That fluids or vapors are capable of thus acting, is rendered somewhat probable by the following experiment. About three drachms of the powdered leaves were mixed with a pint of tepid water, and poured into a sound bladder; the neck of the bladder was then tightly tied; and as soon as the bladder became well moist, the odor of the stramonium was perceptible on its surface. And the great Doctor Darwin, in the second volume of his work entitled *Zoonomia*, says, “There appear to be three different modes by which extraneous bodies may be introduced into the system, besides that of absorption. 1st. By ethereal transmutation, as heat and electricity; 2d. by chemical attraction, as oxigene; and 3d. by *expansive vapor*, as ether, and essential oils.” That the infusion applied to the eye is absorbed, and produces its effect through the medium of the circulating fluids, is an opinion, which is highly improbable. If the infusion acted through this medium, both eyes would be alike affected. The following instance of the action of stramonium on the eye is a curious one, and it favors what we said in a former experiment. “The late Dr. Bond had under his care a patient, a young girl, who had put the seeds of this plant into her eye, which dilated the pupil to such a degree, that she could see in the dark, but in the light was almost blind.” Appendix to Notes on Virginia, written by Thomas Jefferson. Since this vegetable

is capable of acting with such energy on the eye, we may expect, that it will sooner or later be applied with success, in some diseases of that exquisite organ.

If the leaves be pounded into a soft poultice, and applied to a part from which the cuticle is removed, they excite heat and pain; if applied to a part, which is shielded by the cuticle, no effect seems to be produced. Exper. 18. But if a decoction of the leaves be rubbed for some time on the surface of the body, febrile symptoms will be excited. Exper. 19. The decoction externally applied to a very young rat, seemed to induce convulsions. Exper. 20.

The exhalation of stramonium excites head-ache and fever in the human system. Exper. 21. This exhalation, I endeavoured to collect, by putting many branches of the plant under a large glass vessel full of water, and afterwards exposing it to the sun. But in this I did not succeed; the water imbibed the exhalation. That the vapor emanating from this plant is capable of producing febrile action, is an opinion, which is supported by many facts. The following communications countenance this opinion. "Below the falls of Ohio (says a very intelligent gentleman*) I lay some days *in camp*, with General Putnam, and several others. Here the earth was extensively covered with stramonium in full blossom, whose strong odor produced a pain in my head, which continued after leaving that place and till we arrived in the Wabash river. I was now seized with a fever, which had nearly proved fatal, and which was succeeded by a

* John Heckewelder of Bethlehem in Pennsylvania, in a letter.

giddiness of the head of many weeks continuance. General Putnam was also attacked with this fever; he recovered, though his recovery was not expected. Although my illness, and General Putnam's might have arisen from breathing the fogs of the river, yet as I had been accustomed to these fogs before without being affected by them, I have ever been of opinion, that my fever originated from the scent of these plants." And Professor Barton has been informed, that just before the peace of 1783, it was supposed by the physicians of New-York, that the great abundance of stramonium in the vicinity of that city had produced fevers; and that on this account the plant was cut down. For a similar reason (according to the same excellent Professor) a law has been lately passed at St. Vincennes on the river Wabash, for destroying this plant. The inhabitants of the place assert, that previously to its introduction* among them, they knew

* Colonel Winthrop Sargent informed Dr. Barton, that the *Datura Stramonium* has been known to exist on the grounds near the river Wabash above 12 or 14 years. To these parts it was probably conveyed by accident or curiosity. Some persons much admire its flowers. In a letter already quoted, that I received from L. Beckewelder of Bethlehem, there is the following information worthy of note. He says, "I met with this plant about the year 1769, for the first time on the road from this place (Bethlehem) to Philadelphia. Its flower pleased me so well, that after its seeds were ripe, I took some of them home with me, and planted them on a farm near Nazareth. I found the plant at some places on the river Ohio; particularly at Fort Washington. This plant does not grow about Bethlehem, and does not appear in several parts of Pennsylvania." Professor Kalm, who travelled about fifty years ago through this country, from Wilmington in Delaware state, to Quebec in Canada, only speaks of the *Datura Stramonium*, as growing between Wilmington and Philadelphia. From these and other circumstances it is doubtful whether the thorn-apple is a native of all of the United States. Perhaps it is not a native of any one of them.

In a former part of this work I might have observed that the plant is frequently called *James Town*, or *Jameson Weed*, because a number of sailors were once violently diseased by ignorantly eating the boiled plant at *James Town* in Virginia. In like manner I might have observed that it is called *French Chestnut* in New-Jersey.

not what a remitting fever was. It may be said, that the preceding opinions relative to the production of fever by its exhalation, are founded on deception; and that fever in these instances might have arisen from the common cause, vegetable and animal putrefaction. It cannot perhaps be declared, that no putrid animals and vegetables existed at Fort Vincennes, and the other places; where the vapor of the thorn-apple seemed to produce such morbid effects. Vegetable and animal putrefaction might have existed in these places, and co-operate with the scent of the plant in producing disease. As alcohol gives origin to a febrile disposition in the system, in like manner, the scent of these plants might have disposed to the production of fever. But their vapor or scent, I should imagine, would be highly equivolent, without the aid of any other cause, to give rise to fevers of a remitting type; especially when we recollect that the leaf can excite head-ache, convulsion, and mania. Alcohol and opium alone have excited the most violent diseases. I saw, I think, towards the close of last autumn, a case of true yellow fever which was induced in a person somewhat depressed in his mind, who for several days had taken nothing except repeated quantities of wine and brandy. And it is well known that a kind of apoplexy originates from an excessive dose of opium. Thus we see that many morbid stimuli act with equal violence, and in a way somewhat similar on the human system; hence may we not be led to conjecture that their constituent principles may be the same, at least in some degree, though differently combined?

Might not this active vegetable exhalation* be breathed with advantage in some weak habits, and in some cases in which the intestines and stomach are not able to retain medicine? Would it not make a good addition to the pneumatic *Materia Medica*, a science which has been cultivated with considerable success by Dr. Beddoes? Thus, former physicians were in the habit of placing the poppy in the chambers of persons laboring under certain diseases; a practice which might perhaps be revived, and extended with advantage, to many plants.

One grain of the powdered leaves taken in a small quantity of temperate water, in the space of fifteen minutes, increased the frequency, and force of the pulse; and finally produced thirst and sleepiness. Exper. 22.

In five minutes two grains of the same medicine increased the frequency of the pulse. In a longer space of time, they rendered it full and quick, as well as more frequent; and produced the following symptoms, giddiness, warm skin, moist hands and face, intoxication, sleepiness. Exper. 23.

The same quantity of medicine, given to an older person than either of the two former, rendered the pulse full and tense; produced cheerfulness, and increased the appetite for food. Exper. 24.

The medicine given in larger doses produced fullness, quickness, and tension, rather than frequency,

* The other species of *Datura* probably exhale a strong odor. In a garden, which Dr. Smith visited on the continent, he says, that the *Datura arborea* covered with its magnificent and fragrant flowers was at this time the finest thing, and had crowds of visitors every evening. Few people could support its perfume any length of time.

in the pulse; produced intoxication, difficulty of speech, and great thirst; dilated the pupils of the eyes; rendered the blood fizy and the stomach sick; opened the bowels; increased the flow of urine; and gave origin to febrile symptoms of some days continuance. Exper. 25, 26, 27.

From the preceding symptoms produced by stramonium, we may infer that this substance is a stimulant. The experiments on frogs and dogs tend to confirm this opinion. They moreover serve to point out its higher degrees of action.

Like other stimulants stramonium exhausts the irritability of the animal body. The expressed juice of the leaves applied to the heart of a dog destroyed its motion in a few minutes. Exper. 28. But the same fluid injected into the vena cava of a dog, after the heart had ceased to beat, stimulated it into fresh motion. Exper. 29.

The juice when injected into the rectum of a frog, a part of whose thorax had been previously removed that the heart might be viewed, seemed to accelerate its death. And death is accelerated in frogs that are treated in this way, with opium, spirit of hartshorn, and spirit of wine; if we may trust the experiments of the ingenious Dr. Crumpe.

The juice applied to the brain produced convulsions; injected into the abdomen, redness, or inflammation, of some of its contents; injected into the blood, immediate death. Instead of the juice, if water had been injected into the blood, a less sudden death I suspect, would have been the consequence. Exper. 31, 32, 33.

The juice injected into the rectum of a dog induced sickness at stomach, and seemed to disorder the whole alimentary canal; induced intoxication, sleep, and convulsive motions. Exper. 34.

The juice injected into the rectum of a cat produced a violent cough of many days continuance; and in another, it produced a partial loss of hair, and a slight scurfiness of the skin.

The blood drawn from an animal laboring under the effects of a spirituous tincture of the leaves, was found to be loose in its texture; red particles were deposited at the bottom of the bowl; signs according to Dr. Rush of high inflammatory action in the system.

In an animal destroyed by stramonium, two drachms of water were found in the ventricles of the brain; and dissolved blood appeared in the blood-vessels, and dark colored bile in the intestines, and a gall-bladder. In another, the same cause gave origin to a gangrenous state of the mesentery and intestines. Ex. 37.

Drs. Whytt and Woodhouse have found, that the fluid occasionally effused in the ventricles of the brain resembles water rather than serum, as it does not coagulate upon being exposed to the action of heat. This fluid perhaps consists of water, and a very small portion of marine salt. It is doubtless effused by vessels of very fine organization. I have found that it neither coagulates with heat, with spirit of wine, or with vitriolic acid; but a slight precipitation seemed to take place upon mixing it with a solution of caustic vegetable alkali. The effused fluid that I employed was taken from a person who died of mania last year, in the Pennsylvania Hospital.

Hence, stramonium inflames the eye, dilates the pupil of that organ, increases the action of the arteries, and the heat of the body. It gives origin to intoxication, or mania, to convulsion in the muscles, and to inflammation in the bowels, and disposes the liver to secrete an altered bile. It gives origin to gangrene in the intestines and mesentery, to effusion in the brain, renders the blood fizy, loosens and dissolves its texture.

Neither opium, hyosciamus, or cicuta, I believe, affect the eyes so much as stramonium. The fever, the intoxication, and the convulsions, which this last article excites, are probably sympathetic affections depending on its local application to the stomach or intestines. We cannot with propriety attribute such affections to its absorption, and consequent diffusion through the body. Some absorption may take place; yet that they are produced in this way, is opposed by their sudden existence upon the application of the article, and their sudden disappearance upon its removal. Stramonium taken into the stomach, in a very few minutes affects the head and the arteries. In the first volume of the American Philosophical Transactions, Dr. Rush has related the case of a child who was much affected in consequence of swallowing the seeds. In this case the symptoms were fever, tremors, blindness, and an eruption on the skin, which immediately disappeared upon the final evacuation of the seeds from the stomach and intestines, by the repeated use of vomits and purges.

The intoxication or mania, which stramonium induces, seems to be analogous to that which arises from the action of opium, alcohol and some other stimu-

lants. Like alcohol it sometimes induces mania of many days continuance. In Beverley's History of Virginia, a remarkable account is related of its effects on several persons, who gathered, boiled, and ate it for greens. In each of these persons it seems, that a mania came on, which lasted about eleven days.* According to some it has induced mania which has continued during life. Do not such facts throw a blaze of light on the nature of the mind? Should we not be induced to attempt the discovery of other articles which affect the mind? May not articles exist which are capable of affecting all its different faculties? May not posterity gain a dominion over it, nearly as complete as that, which we possess over the soil of our gardens?

In two persons† who boiled the leaves for vegetable food in New Jersey, violent diseases supervened; mania in one, and tetanus in the other. Two children who had eaten of the seeds, seemed to labor under hydrophobia according to Dr. Lobstein.‡ They rejected every kind of liquid, and on offering a cup-

* The James-Town weed being an early plant was gathered very young for a boiled salad, by some of the soldiers sent thither; and some of them eat plentifully of it, the effect of which was a very pleasant comedy; for they turned natural fools upon it for several days: one would blow up a feather in the air; another would dart straws at it with much fury; and another stark naked was sitting up in a corner, like a monkey, grinning and making mouths at them; a fourth would fondly kiss and paw his companions, and sneer in their faces, with a countenance more antic than any in a *Dutch Droll*. In this frantic condition they were confined, lest they should in their folly destroy themselves; though it was observed, that all their actions were full of innocence and good nature. Indeed they were not very cleanly; for they would have wallowed in their own excrements, if they had not been prevented. A thousand such simple tricks they played, and after eleven days returned to themselves again, not remembering any thing that had passed. Beverley's History of the present state of Virginia. Book 2, page 24. London, 1705.

† Dr. Barton's Lectures on the *Materia Medica*.

‡ Medical Transactions, Vol. V. page 83.

full of drink to them, the moment it touched their lips violent spasms invaded the throat. Thus it seems that one cause acting on different constitutions may be capable of giving origin to three seemingly different diseases, or morbid states of the system, mania, tetanus, and hydrophobia. May we not hence conjecture, that whenever these diseases exist, they are owing to causes which are the same, or which act in a similar manner. These causes must be of a stimulating nature, and excite excessive and irregular action in the system. If we would obviate this action, we must have recourse to remedies, which eradicate the original cause of it, or which by their sedative operation diminish the commotion, or oppression of the system. Dr. Rush, who may be justly styled the father of medicine in this country, has attributed diseases in general, to stimulus, as their remote, and to excessive and irregular action, as their proximate cause. Do not the facts just mentioned in some measure confirm the justness of his theory of disease. But the justness of his theory is better confirmed by the success which attends its application to medicine.

Stramonium disposes the liver to morbid secretion. In thus acting it resembles opium, alcohol, and the miasma, which produces intermitting and yellow fevers. But it does not constipate the bowels like opium. On this account it may prove more useful than opium in certain diseases. In not constipating the bowels it resembles hyoscyamus niger, or henbane, which keeps the intestines lax, according to Dr. Barton's ingenious experiments on this plant. The inflammation and gangrene in the intestines, the effusion of water in the brain, the fizy, loose, and dissolved blood, pro-

duced by the action of stramonium on animals, possess a great similitude to the effects of malignant fevers on man.

There are many instances of death being the consequence of taking stramonium. Some years ago, in the county of Burlington in New Jersey, two children* were destroyed by eating its seeds.

In cases in which our plant is taken into the stomach, the seeds, the leaves, or the root, the best remedies will be vomits and purges often repeated to evacuate the offending substance; and copious bleedings to diminish, or obviate the violence of its action. Dr. Rush has evinced the utility of vomits and purges, for obviating the effects of this plant; and that bleeding will also be proper, I infer from its successful use, in cases wherein the *hyosciamus niger* or common henbane, and opium, have been taken into the stomach. Sir Hans Sloane cured four children, by bleeding, blisters and purges, who were seized with great thirst, vertigo, dimness of sight, and profound sleep, upon eating the seeds of the *hyosciamus niger*. And Dr. Rush has lately applied copious bleedings with success in the disease which arises from swallowing opium. But the following case in the best manner answers my purpose. In a child that had taken into her stomach some of the seeds of stramonium last fall, blood-letting and purges were used with the best effects. The blood which was drawn was cupped. This patient I saw. She was attended by my ingenious friend Dr. Caldwell. In

* This information I received from my respectable and intelligent friend, Samuel Coats, one of the Managers of the Pennsylvania Hospital.

slight cases, or after the use of more powerful remedies the vegetable acid may prove serviceable. In affections produced by the plant, it has been used with advantage by the late Dr. Bond and others.

But a plant diffusing such a poisonous exhalation should not be suffered to grow upon farms, near roads and houses, or upon vacant grounds in cities. The rich soil, which it infests, and impoverishes, should be surrendered to more salutary vegetables. Its abode should be confined to the remotest corners of private medical or botanical gardens. Few or no accidents would then arise to children from swallowing its seeds; foreigners, or ignorant persons would not be tempted to use it for food; its morbid exhalation would seldom or never be breathed; and when recourse was had to its aid, as a remedy, it would more readily affect the human system.

From what has been related relative to the effects of stramonium on the animal body, we may fairly conclude that it is a stimulant. In this opinion we are not alone. It is held and taught by two of the Professors in the University of Pennsylvania; and in the second volume of the *Zoonomia* it is enumerated among the inciting articles of the *Materia Medica*.

On the use of Stramonium in Medicine.

To that acute physician Dr. Storck, are we indebted for introducing the *Datura Stramonium* in the cure of diseases. He exhibited an extract of the leaves of this plant with advantage, in some cases of mania, in epilepsy, and some other convulsive affections. In similar cases this remedy was afterwards used by Dr. Wedenberg and Dr. Odhelius and with considerable success. Dr. Greding was then induced to try the *Stramonium*; he gave it in a great number of epileptic cases, and in cases of epilepsy joined with mania, and only found the remedy to be effectual in a single instance. And the late very respectable Dr. Cullen thinks, that it is seldom suited to the cure of such diseases. Yet, as if unwilling to decide on a subject concerning which such different opinions were entertained; he says, "Nevertheless, I have no doubt that Narcotics may be a remedy in certain cases of mania and epilepsy; but I have not, and I doubt if any other person has, learned to distinguish the cases to which such remedies are properly adapted."

Thus it seems that Drs. Storck, Wedenberg, and Odhelius, gave the medicine with success, while Dr. Greding found it to be nearly useless. The former physicians might have given it in proper cases, and doses, while the latter one in these respects might have erred. On the occasion Dr. Cullen deduces

nothing from his own experience. He considers stramonium as a narcotic, and therefore a sedative. But the preceding experiments and observations I hope will evince, that it produces stimulating effects on the animal body. The following cases may in some measure point out the conditions of the system in which it may prove useful.

The preparation of the plant which has been chiefly given in these cases is the powder of the leaves. The dose is from half a grain to four grains, mixed with conserve of roses or water twice or thrice in the day.

IN EPILEPSY.

DR. RUSH has greatly simplified and elucidated the subject of Nosology, by considering pleurisy, phrenitis, mania, apoplexy, and numerous other diseases, as febrile states of the system. To the number of these febrile states of the system, I think epilepsy might be added. For it is induced by the same causes which induce other fevers. These causes are alcohol, terror, obstinate costiveness, a cessation of certain discharges, as in the cases of piles, ulcers, &c. It appears to be a fever, at least a compound one, because during the existence of a paroxysm the pulse is uncommonly tense, and full, the face red, and the pupils of the eyes dilated; symptoms which frequently occur in fevers. Moreover in the intervals between the fits the patient is subject to vertigo, and his tongue is for

the most part white. Like other fevers, epilepsy generally attacks the young, and the plethoric, and occurs in the night, and sometimes changes into mania. In a woman, who, during the existence of a paroxysm, died of epilepsy in the Pennsylvania Hospital, in the spring of 1796, the arteries of the brain seemed to be enlarged to twice their usual size. Other dissections have discovered water, and hydatids in the brain; effects which probably resulted from morbid action in the arteries of that viscus.* Dr. Rush has effectually cured it once or twice by mercury; but, has not, I believe, succeeded always upon using this remedy. In epilepsy Dr. Darwin has exhibited opium with great success. I suspect that stramonium is a remedy which is equal, if not superior to either of these, in the present disease. It is a less disagreeable remedy to the patient than mercury, as it does not confine him to his bed, by inducing a painful affection; and it seems to answer all the purposes of opium, without constipating the bowels. It was used with considerable success in the case of a boy about twelve years old, in the Pennsylvania Hospital, in part of the autumn and winter of 1796. I will briefly relate his case. If the contagion of the yellow fever did not occasion his epi-

* This disease has been cured, or suspended by the small-pox, by pulmonic, and by intermitting fever. I was informed by a black man, whom I could believe, that he had been once very subject to fits, which according to his description must have been of the epileptic kind; and that his fits had never returned upon his violently having the natural small-pox. There is at this time a patient in the Pennsylvania Hospital, who has been long subject to epileptic fits, yet upon his being lately attacked with pulmonic fever, they have entirely ceased to occur. A boy who was much harassed by fits remained free from them for several months; but during this time he labored under an intermitting fever, as presently will appear. Hence is it not probable that epilepsy is a fever, as it seems at least sometimes to change into other fevers.

lepsy, the cause of it is unknown. I am informed by his friends, that he had the first epileptic fit during the prevalence of the yellow fever in Philadelphia in 1793; that he had another in about two months afterwards; and that the fits in 1794, and in the beginning of 1795 occurred somewhat more frequently, till he at length had one about every two weeks. But I am told that in the summer of 1795 he was sent into the country, where he was attacked by an intermitting fever, under which he labored for four or five months. During this period, it seems that his fits entirely left him; but that they returned upon the disappearance of the fever. In the winter of 1795, and in the spring and summer of 1796, he took the cuprum ammoniacum and some other remedies, which seemed in some measure to lengthen the intervals between the fits. But not being durably relieved by these remedies, they were discontinued; and he was admitted a patient into the Pennsylvania Hospital in the autumn of last year. He now had three or four fits every week. Dr. Shippen who was at that time the attending physician, prescribed for him Fowler's mineral solution to be given in small quantities. As the fits became more frequent upon using the solution, it was discontinued. Half a grain of the powdered leaves of stramonium was now prescribed; it was to be taken in the morning and evening, and the dose was gradually increased to three grains twice in the day. Upon taking this last medicine, his fits soon began to diminish in force and frequency; and at length he appeared to be cured of them. It is proper to observe that he was bled and purged before taking the stramonium, and was bled again a week or two afterwards. And that at a time

when he seemed to be threatened with a paroxysm, Dr. Rush, who succeeded Dr. Shippen in the Hospital, had him bled with obvious advantages. Would not the application of pressure to the carotid artery just before its commencement, prevent the fit? This boy was discharged from the Hospital as cured, but I am sorry to add that after remaining about five months free from the fits, he has had a return of them. About the beginning of this spring after getting his feet wet by long exposure on a rainy day, and coming in the evening into a close warm room, and having to do some work which required stooping, he was seized with a fit. He has had several of them within the two last months; but he has lately been bled and purged, and resumed the pills with much advantage. The last fit and the preceding one have been less violent, and more protracted in their access. By bleeding and stramonium a perfect cure may yet be effected. If they should fail the age of puberty may make a favorable change in his system.

I gave two grains of the powdered leaves every evening to a woman about thirty years old, having imperfect speech, and a kind of catalepsy, which returned every night, and lasted about an hour. These affections, I believe, arose from frequent spirituous intoxication. Upon taking the medicine about three weeks, she appeared to be cured of the catalepsy, and relieved of the imperfect speech. Might not stramonium be taken as a substitute for alcohol in persons, who wish to relinquish the use, or who suffer great inconvenience from the want, of this noxious article?

Two grains of the powdered leaves taken evening and morning, seemed to be of much service to a woman, who had long been subject to tremors of the limbs, and occasional epileptic fits; affections which seemed chiefly to arise from a contortion and ulcer in the foot.

Our remedy was given in some cases of epilepsy in the Alms House of this city with a success not to be regretted. Dr. Hart, who attended to its effects, informed me, that it performed a cure in one of them; and that it relieved the others.

The following valuable observations on the effects of stramonium in epilepsy, I lately received in an obliging letter, from Dr. John Archer of Harford county, Maryland. This letter contains other observations respecting the use of stramonium, which I shall detail in their proper places. “ I have administered the stramonium to several with various effects, to some with great advantage, and to others without any other advantage than prolonging the time of the return of the fit, or only lessening its duration. I observed that those, who had regular returns of the fits, or had them at short intervals, received the greatest benefit; because they could take a sufficient quantity of the medicine before the time of a return. By this means the return of the fit was prevented, then attending to the time another fit should return, the medicine was again given, and in general a cure obtained; but those, who had irregular returns of the fits, unless of short duration, could not take the stramonium so as to act at the time of the fit, as it came on unexpectedly; these were not much benefited.

“ In the epilepsy with regular periods of return, I order two grains of the powdered seeds made into a pill, to be given every four hours, until some sensible effects are produced ; and then lengthen the time to six or eight hours, so as to keep up some sensible operation of the medicine, until the time of the fit. The medicine is now to be omitted till three or four days before the next return. It is then to be exhibited as before. To use the stramonium with effect in these cases, and with any benefit in the preceding ones, low diet and occasional blood-letting should be enjoined.

“ I need scarcely remark to you that those patients, who have irregular returns of the fits with long intervals, must take the stramonium constantly, else they will miss the proper time of taking it. In such cases though it may not prevent the return of the fits, it may mitigate their violence. I have also remarked that it is administered with little or no advantage to those patients, who are become simple or foolish by the violence or long continuance of the disease.

“ The seeds should be gathered when fully ripe before the frost and the rains injure them. The best seeds for use are of a blackish color. Take a scruple of the powdered seeds, half a scruple of flower, and a sufficient quantity of water ; mix them well, and divide them into ten pills. These are to be given as already directed.

“ I do believe the seeds of stramonium to be a valuable medicine in many diseases ; I have tried them in several others with great advantage, as mania, retention of urine, &c. but they must be given with re-

gularity and attention. In my opinion in a regular epilepsy, it is as powerful, as the peruvian bark in intermittents."

In the cure of epilepsy how does stramonium act. Does it act by giving origin to a new disease, or by wasting that general or partial accumulation of excitability, or sensorial power, which favors the production of a paroxysm?

IN MANIA.

This disease, which Dr. Rush has proved to be a fever, may in some of its forms be obviated or relieved by stramonium. In J. B. this remedy appeared to effect a cure. Being deranged in his mind, and somewhat outrageous he was admitted into the Hospital during Dr. Parke's attendance last summer. He was bled and purged several times; in consequence of this treatment he became somewhat more rational. After these remedies two grains of the powdered leaves of stramonium were prescribed; these were to be taken every evening and morning. The medicine occasioned whiteness of the tongue, fever, and a slight head ache. He took the stramonium about two weeks, rapidly grew better in his reason; and was discharged from the Hospital as cured. Dr. Rush considers the occurrence of head-ache in maniacal cases as a favorable symptom, and I have seen it frequently occur in his patients at the Hospital as soon as their derangement had much diminished or ceased. Might not this

salutary symptom in mania be accelerated, or induced in many cases of this disease by the use of stramonium?

M. R. wild and melancholic having been deranged for some months, took one grain of the powdered leaves of stramonium morning and evening. Previously to taking the medicine he was bled and purged several times. The medicine seemed to make little or no impression on him, but upon increasing it gradually to four grains, he became affected with fever and pains in his limbs. He now became rational: But successive suppurations occurred in the parts where the pain existed. Openings were occasionally made into the collections of pus: and at this time he appears to be on the recovery, and continues to be rational.

To M. F. melancholic, a female patient, one grain of an extract of the leaves was given night and morning, which quantity was gradually increased to three grains. She was delighted with the medicine, seemed to get better, and would anxiously call for the pills when they were out. By some means she at length discovered that they were made of what she called Jemefon weed, and refused to take any more of them. Upon taking the medicine in increased doses she informed me, that she frequently saw small dark spots in the air; and that sparkles of light sometimes seemed to proceed from her eyes. Dr. Archer within these few days informed Dr. Rush that in a certain case in which he gave stramonium double vision was produced.

For J. B. laboring under melancholy madness, Dr. Wistar last summer prescribed stramonium in doses of half a grain, to be taken twice in the day; but the

medicine affected her stomach with so much sickness that it was discontinued.

It was given to several persons in the cells of the Hospital who had been deranged for many years; some of these it seemed to relieve by exciting violent diarrhœa; others again it seemed to injure. In these latter instances some advantages might perhaps have been derived from it, if its use had been premised by bleeding and purging.

IN TETANIC FEVER,

DR. ARCHER's letter informs me that he once moderated the symptoms of tetanus by giving stramonium; and that Dr. Simmes formerly his student, now living in Georgia, had succeeded in the cure of a tetanus by using this medicine. Dr. Archer adds, that he attributes his own late ill success in some cases of tetanus wherein he administered stramonium to his not having preceded the remedy by evacuates.

IN HYDROPIC AND PARALYTIC FEVERS.

IN one hydropic, and two paralytic cases, in which our remedy was tried, it seemed to prove injurious.

IN FEVER WITH SWEATS.

IN a case of nocturnal fever attended with sweats, two grains of the powder were given several hours be-

fore going to bed, for about a week. But it was necessary to discontinue the remedy, as the fever and sweats were increased. He was afterwards cured by purges and elixir of vitriol.

IN INTERMITTING FEVER.

IN a case of intermitting fever in which two grains of the powdered leaves were given about two hours before its expected attack, the paroxysm was prevented.

IN AFFECTIONS OF THE EYES.

IN a case of gutta serena where the pupil had not lost the whole of its irritability, the seeds taken twice in a day, first half a grain of them, and afterwards three grains, seemed to produce some increase of vision; but on account of the medicine disagreeing with his stomach he relinquished its use. In this case the local application of an infusion of stramonium, might perhaps have answered a good purpose. Two old women with weak eyes seemed to derive some benefit from applying to the eye the juice of the leaves diluted with water. The strength of the preparation was a drop of the juice to an ounce of water. A weak infusion of the dry leaves would perhaps be equally serviceable as a preparation of the diluted juice.

IN RHEUMATIC FEVER.

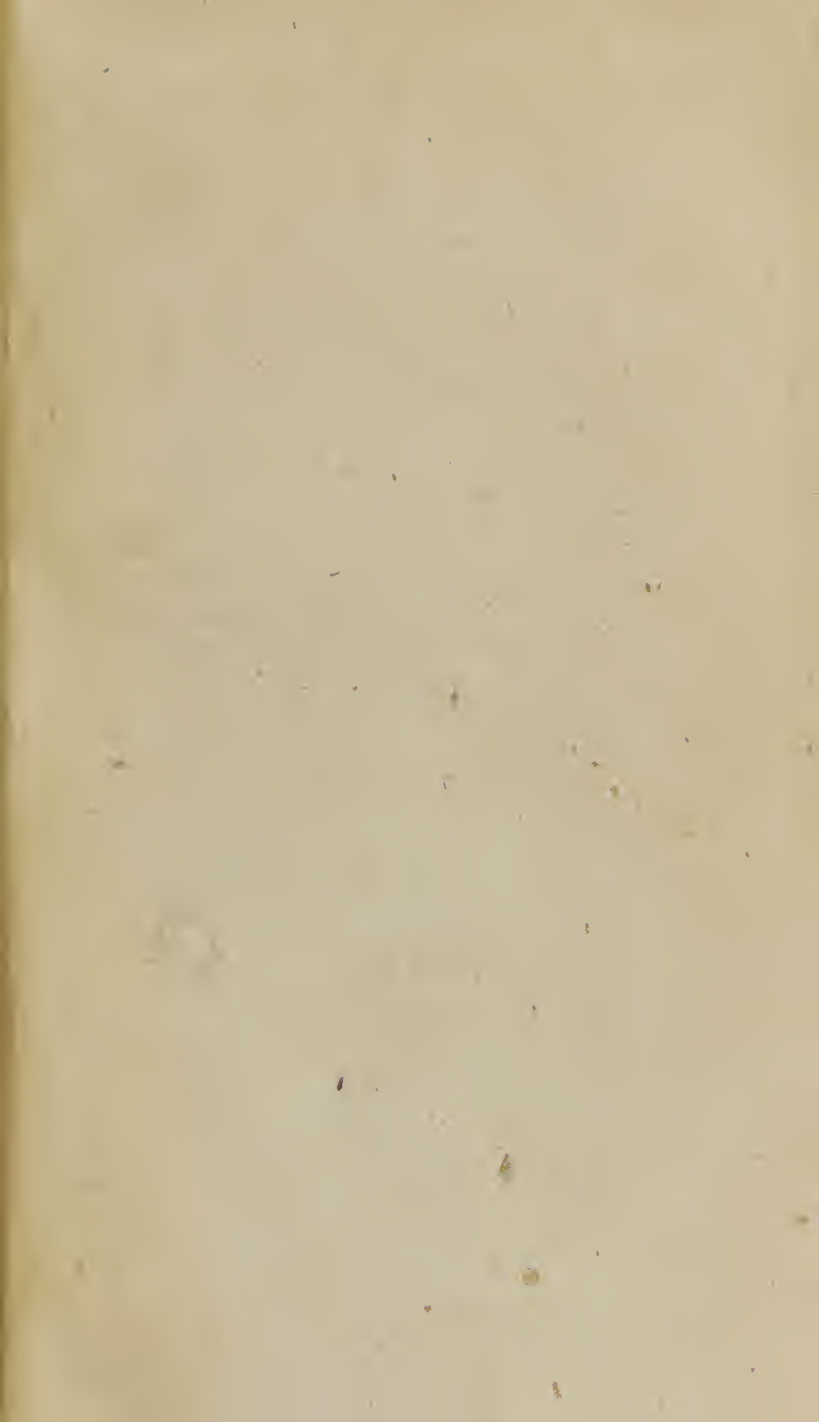
Dr. RUSH prescribed last winter, a spirituous tincture of the leaves for a pain in the knee in the Hos-

pital. It seemed to relieve the affection by causing eruptions on the skin. An ointment made by boiling the green leaves of the plant in hog's lard, I once saw prove very serviceable in violent rheumatic pains. Dr. Bache informed me that an old lady in the country near the city, applies this ointment with great success in cases of club-feet. I lately saw it of great service in one of these cases. It is said that this ointment is very useful in burns and in piles.

I must now conclude these pages. Time will not permit me to dwell any longer on this interesting subject. The preceding experiments and observations have been accomplished at the expense of some ease, and some health. But if they should in any way extend our knowledge of a powerful vegetable substance; if they should collect into a point some of its different effects on the animal system; and, if they should have the least tendency to obviate any portion of human misery; my ends will be answered, and I shall conceive that my labors have been rewarded by an ample recompence.

F I N I S.

In page 29 after the following sentence near the bottom "The lungs appeared to be surcharged with blood." read, The blood in the *venæ cavæ* in the right auricle and ventricle of the heart, was in a dissolved state,



Med. Hist.

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